TRIGONOMETRÍA

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Identidades trigonométricas

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FUNDAMENTALES

I. IDENTIDADES DE VARIABLE SIMPLE

$$\operatorname{sen}^2\theta + \cos^2\theta = 1$$
$$1 + \tan^2\theta = \sec^2\theta$$
$$1 + \cot^2\theta = \csc^2\theta$$

$$\csc\theta.\operatorname{sen}\theta = 1$$
$$\sec\theta.\cos\theta = 1$$
$$\tan\theta.\cot\theta = 1$$

$$\tan\theta = \frac{\operatorname{sen}\theta}{\cos\theta}$$
$$\cot\theta = \frac{\cos\theta}{\operatorname{sen}\theta}$$

IDENTIDADES TRIGONOMÉTRICAS AUXILIARES

$$\operatorname{sen}^4\theta + \cos^4\theta = 1 - 2\operatorname{sen}^2\theta\cos^2\theta$$
$$\operatorname{sen}^6\theta + \cos^6\theta = 1 - 3\operatorname{sen}^2\theta\cos^2\theta$$
$$\tan\theta + \cot\theta = \sec\theta.\csc\theta$$
$$\sec^2\theta + \csc^2\theta = \sec^2\theta\csc^2\theta$$
$$(1 + \operatorname{sen}\theta + \cos\theta)^2 = 2(1 + \operatorname{sen}\theta)(1 + \cos\theta)$$

PROPIEDAD

Si a, b y c : constantes reales $c \neq 0$

x: variable real

$a\operatorname{sen}x + b\cos x = c \wedge a^2 + b^2 = c^2$

Entonces

$$\operatorname{sen}x = \frac{a}{c} \qquad \cos x = \frac{b}{c}$$

II. IDENTIDADES DE VARIABLE COMPUESTA

IDENTIDADES PRINCIPALES

$$\text{Sen}(x \pm y) = \text{Senx}.\text{Cosy} \pm \text{Cosx}.\text{Seny}$$

$$\text{Cos}(x \pm y) = \text{Cosx}.\text{Cosy} \mp \text{Senx}.\text{Seny}$$

$$\text{Tan}(x \pm y) = \frac{\text{tanx} \pm \text{tany}}{1 \mp \text{tanx}.\text{tany}}$$

IDENTIDADES AUXILIARES

$$\text{sen}(x+y)\text{sen}(x-y) = \text{sen}^2x - \text{sen}^2y$$

$$\cos(x+y)\cos(x-y) = \cos^2x - \text{sen}^2y$$

PROPIEDAD 1

Siendo a y b constantes reales, x variable real

entonces :

$$-\sqrt{a^2+b^2} \leq a\text{sen}x + b\cos x \leq \sqrt{a^2+b^2}$$

PROPIEDAD 2

Si $\alpha+\beta+\theta=180^\circ$

$$\Rightarrow \quad \tan\alpha + \tan\beta + \tan\theta = \tan\alpha\tan\beta\tan\theta$$

III.1 IDENTIDADES DE VARIABLE DOBLE

$\text{Sen}2\theta = 2\text{sen}\theta\cos\theta$

$\cos 2\theta = \cos^2\theta - \text{sen}^2\theta$

$\tan 2\theta = \dfrac{2\tan\theta}{1-\tan^2\theta}$

$2\cos^2\theta = 1 + \cos 2\theta$

$2\text{sen}^2\theta = 1 - \cos 2\theta$

IDENTIDADES DE DEGRADACIÓN

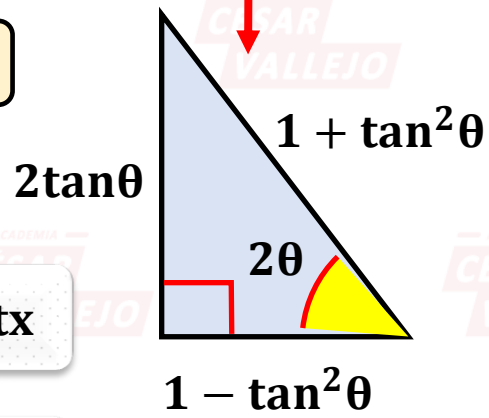
IDENTIDADES AUXILIARES

$\cot\theta + \tan\theta = 2\csc 2\theta$

$\cot\theta - \tan\theta = 2\cot 2\theta$

$\cot\left(\dfrac{x}{2}\right) = \csc x + \cot x$

$\tan\left(\dfrac{x}{2}\right) = \csc x - \cot x$



III.2 IDENTIDADES DE VARIABLE TRIPLE

$\text{sen}3x = 3\text{sen}x - 4\text{sen}^3 x$

$\cos 3x = 4\cos^3 x - 3\cos x$

$\tan 3x = \dfrac{3\tan x - \tan^3 x}{1 - 3\tan^2 x}$

IDENTIDADES AUXILIARES

$\text{sen}3x = \text{sen}x(2\cos 2x + 1)$

$\cos 3x = \cos x(2\cos 2x - 1)$

$\text{sen}3x = 4\text{sen}x\,\text{sen}(60° - x)\text{sen}(60° + x)$

$\cos 3x = 4\cos x\cos(60° - x)\cos(60° + x)$

IV. TRANSFORMACIONES TRIGONOMÉTRICAS

DE SUMA O DIFERENCIA A PRODUCTO

$$\operatorname{sen}A+\operatorname{sen}B=2\operatorname{sen}\left(\frac{A+B}{2}\right)\cos\left(\frac{A-B}{2}\right)$$

$$\operatorname{sen}A-\operatorname{sen}B=2\cos\left(\frac{A+B}{2}\right)\operatorname{sen}\left(\frac{A-B}{2}\right)$$

$$\cos A+\cos B=2\cos\left(\frac{A+B}{2}\right)\cos\left(\frac{A-B}{2}\right)$$

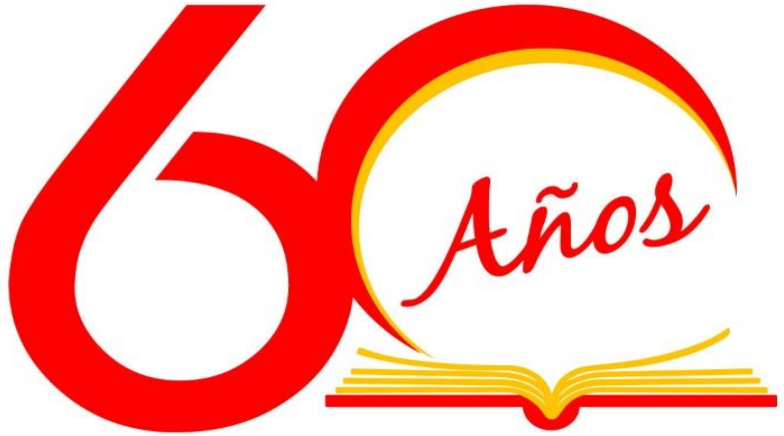
$$\cos A-\cos B=-2\operatorname{sen}\left(\frac{A+B}{2}\right)\operatorname{sen}\left(\frac{A-B}{2}\right)$$

DE PRODUCTO A SUMA O DIFERENCIA

$$2\operatorname{sen}A\cos B=\operatorname{sen}(A+B)+\operatorname{sen}(A-B)$$

$$2\cos A\cos B=\cos(A+B)+\cos(A-B)$$

$$2\operatorname{sen}A\operatorname{sen}B=\cos(A-B)-\cos(A+B)$$



¡Gracias!